THURSDAY, APRIL 22, 1886

INJURIOUS INSECTS

Reports on Insects Injurious to Hop Plants, Corn Crops, and Fruit Crops in Great Britain. Prepared for the Agricultural Department, Privy Council Office, by Charles Whitehead, F.L.S., F.G.S. No. II., "Insects Injurious to Corn, Grass, Pea, Bean, and Clover Crops." (1885.)

Reports of Observations of Injurious Insects and Common Farm Pests during the Year 1885, *with Methods of Prevention and Remedy.* By Eleanor A. Ormerod, F.R.Met.Soc., &c. (London: Simpkin, Marshall, and Co., 1886.)

THE first of these works, a Government Report issuing from the press of Messrs. Eyre and Spottiswoode, and bearing the announcement that it was "Presented to both Houses of Parliament by command of Her Majesty," forms the second of the series, and is a very valuable contribution to the knowledge of the insects destructive to crops mentioned above. It will be of great service to agriculturists, whether scientific or otherwise, as the whole Report from beginning to end is written in a clear and concise manner, without losing any of its accuracy. The Report occupies seventy pages, and of these, forty-nine pages are devoted to "Insects injurious to corn and grass crops." From p. 50 to 56 "Insects injurious to corn in store" are treated of, and from p. 57 to the end "Insects injurious to pea, bean, and clover crops" are dealt with. Each insect has a separate article devoted to it, uniformly treating first of the habits of the creature, the manner and extent of its devastations, then under separate heads the life-history is given, prevention, and remedies.

The crane-fly, or more popularly the daddy-long-legs (*Tipula oleracea*, L.), comes in for a considerable share of attention. Mr. Whitehead reminds us that "It is the larvæ or grubs that injure plants of corn and grass, by attacking them with their strong jaws and eating into them just beneath the surface of the ground, so as either to kill them or make them weak and sickly. In the early spring, if wheat plants which show signs of failing are examined, large ash-grey grubs or maggots will often be found close to the affected plants. Oats and barley are equally liable to harm from these grubs, not perhaps quite to such an extent as autumn-sown wheat, and especially wheat sown after clover leys."

Mr. Whitehead gives the following estimate of loss occasioned by these insects:—"A field of oats sown on March 1, after clover, was attacked by these grubs. Although it was an even strong plant, it was soon nearly half devoured, and, instead of nine quarters per acre being obtained, as might have been expected from the state of the land, and the circumstances of its cultivation, and the produce of other land hard by, only about four quarters per acre were grown. It is computed that the loss in this case amounted to 80*l*." As an illustration of Mr. Whitehead's manner of treating the life-history of the several insects, the following quotation from that of the daddy-long-legs will suffice:—"The life-history of the crane-flies, both of the *Tipula oleracea* and its close congener *Tipula maculosa*, is simple. The eggs are small, oval, conical grains, shining and black as ebony (as Curtis writes), forming a mass which occupies nearly the whole of the abdomen. As many as 300 have been found in one female. These are deposited, in the autumn, upon grass and herbage, and more frequently in the ground. Wet, undrained meadows and marshy and damp places are preferred by these insects, and the conditions of such spots are probably favourable to the preservation and the ultimate hatching of the eggs. This hatching takes place in the early spring, directly the weather becomes mild. . . . After hatching, the maggots or larvæ grow fast until they become an inch in length. Labourers call them 'leather jackets' because of their tough skins. Their colour is of the earth, with a slight dash of grey or ash colour in it. Although they have no legs, they are able to move rapidly from place to place, and burrow in the ground. It is in this grub form that they do mischief to crops, and they remain in this stage of their existence until the beginning of July, at which period they change into pupæ under the surface of the soil. After a while the pupæ work their way up to the light by means of hooks or recurved spines, and in a short time the crane-flies appear, and soon unfold their long wings and fly away to commence a new series."

After some further notes descriptive of the insects, some instructions are given under the heads of Prevention and Remedies.

It will be seen that the mode of imparting information is of the simplest and clearest description, and in this as well as in the manner of treatment the author has followed Miss Ormerod in her well-known manual, and moreover he frequently quotes her views and opinions expressed throughout her valued reports.

Just as we are finishing this notice Miss Ormerod's ninth annual "Report of Observations of Injurious Insects and Common Farm Pests during the Year 1885, with Methods of Prevention and Remedy," comes to hand. Like its predecessors, it is full of interesting and valuable records. Miss Ormerod has still something more to say on that general pest referred to above—the daddy-long-legs. It is, perhaps, not generally known how difficult the grubs are to kill, but Miss Ormerod's experiments, as recorded in a previous Report, proved that they could endure almost any amount of freezing and yet come to life as the season returned. Speaking of the grubs, one correspondent, in the Report before us, says:—"In my experience, any chemicals applied for their destruction when they begin to make their ravages must destroy the grain. I have had them covered with salt and soot over night, and they have been alive in the morning." Miss Ormerod here notes that "This observation quite agrees with the result of the experiments of Mr. Ralph Lowe (noted p. 26 of Report for 1884), in which grubs covered respectively with quicklime, soot, household salt, and superphosphate, and also some placed in earth mixed with one-fourth of white arsenic, were not at all the worse, excepting those that had been in the arsenic, and even these recovered before the following day. But nitrate of soda had much more serviceable effects."

It is satisfactory to find that the cases of injurious insects which were exhibited for so long a time in the Bethnal Green Museum are being thoroughly overhauled.

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Miss Ormerod remarks in the preface to her Report that the rearrangement of these cases, in which are shown insects injurious to crops, fruit, and timber, is now in progress, and promises to be of practical service. "The insects exhibited are for the most part those which are serious in their ravages, and, as far as is possible, they are shown in their various stages (either by specimens, drawings, or models), with samples of injury caused by them accompanying."

Appended to the Report are some special observations on the warble-fly or ox-bot-fly.

ACROSS THE JORDAN

Across the Jordan: Being an Exploration and Survey of Part of Hauran and Jaulan. By Gottlieb Schumacher, C.E. With Additions by Laurence Oliphant and Guy Le Strange. (London: R. Bentley and Son, 1886.)

THIS volume is the last of several recently published by the Committee of the Palestine Exploration Fund, following quickly on the steps of Conder's "Heth and Moab" and Hull's "Mount Seir," and describes with great accuracy a district lying to the east of the Sea of Galilee not often visited; or, if visited, only hastily skirted, by travellers on the road from Jerusalem to Damascus. How little is known of its geographical details may be gathered from a comparison of the excellent map which faces the title-page of the book with any of the best maps now published. The district described embraces the eastern part of the Jaulan and the western of the Hauran, and is remarkable for the number and variety of its works of ancient art, dating from the time of the dolmen-builders to those of the Crusaders, and including structures referable to Jewish, Greek, Roman, and Christian times. How this region came to be explored is narrated by Mr. Walter Besant in the preface. It appears that about a year ago a firman was granted by the Porte for the survey of the district lying between Haifa on the Mediterranean and Damascus, with a view to the construction of a railway. For the western part of this route, namely, that between Haifa and the Jordan Valley, the maps of the Palestine Exploration Society afforded the necessary details; but from the Jordan to Damascus the line of country had to be specially surveyed, and this work was intrusted by the *concessionnaires* to Herr Gottlieb Schumacher. In the course of his work Herr Schumacher was able to make many scientific observations, as well as maps and drawings of villages, structures, and works of art, which he afterwards embodied in the memoir forming the greater part of the present volume. A ready means of publication was found in the active Society which has done so much in elucidating, and embodying in maps and memoirs, the topographical details of Palestine and its borders.

To the geologist, as well as to the antiquarian, the region of the Jaulan and Hauran is full of interest, and the author has added some details on its geological structure which are very acceptable. The best and most recent observations on this subject are those of Prof. L. Lartet, and contained in his work on the geology of the Dead Sea.[1] The country, as is well known, is volcanic, and is largely covered by sheets of basalt, scoriæ, and ashes which have been erupted from numerous vents, some of which lie in the district here described. Several of these, such as Tell-ej-Jabiyeh and Tell-ej-Jemû'ah, reach an elevation of considerably over 2000 feet above the Mediterranean, and therefore of nearly 3000 feet above the surface of the Sea of Galilee. The southern margin of the Jaulan region, as well as of the basaltic formation, is marked by the deep gorge of the Yarmûk (Hieromax of Pliny), to the south of which the soft *Cretaceo-Nummulitic* limestones reach the surface and afford a genial soil to forests of oak. The Yarmûk receives several tributaries from the north, now correctly mapped for the first time, which lay open on their banks fine sections both of the volcanic rocks and of the underlying chalky limestones; and these streams, which are large and swift, are often precipitated over cliffs of basalt, forming fine cascades. One of these in the Wady Seisûn, a tributary of the Rukkad, has a fall of 100 feet, and then, pursuing its course by a succession of cataracts, unites with the larger stream after falling 517 feet in 420 yards. The Rukkad rises at the foot of Mount Hermon Jebel-esh-Sheikh), a little above the village of 'Ain-el-Berbab, and, upon the melting of the snows in early summer, sends a large flood of water into the Yarmûk. It is remarkable, however, that none of these streams depend altogether on surface drainage for their permanent supplies, as they have their sources in springs; and the combined volume of these waters goes to form a river of equal volume with that of the Jordan itself where it leaves the Lake of Galilee. There are clear indications of the existence of large underground reservoirs of water in the basaltic and calcareous formations. The winter snows and "the former and latter rains" of autumn and spring rapidly sink into the fissured and broken strata, and are pent up, either in the mass of the rock itself, or in caverns which have been formed in the limestone by the solvent action of percolating water. These waters probably accumulate under the tracts sloping towards the south from the base of Hermon to the north of the Yarmûk Valley, and when a vent is formed rise to the surface with force. One of these springs, that of Râs-el-'Ain at the village of El Mezeirîh, fills a considerable basin, and is two to three yards across and about two feet deep at its source; others are of nearly equal copiousness and more or less thermal.

The physical phenomena connected with the district described by Herr Schumacher have their counterpart in the volcanic district of Central France, with this exception, that there do not appear to be any examples of the highly silicated class of lavas, such as domite, trachyte, &c., which we generally find associated with the basic varieties. As regards the geological age of the volcanic outbursts, the question is brought within narrow limits by their relations to the Cretaceo-Eocene limestones. Both these formations appear to have been not only deposited, but subsequently upraised and largely denuded, before the volcanic lavas issued forth from their subterranean reservoirs. As this movement and denudation of the strata took place in the Miocene epoch, the volcanic eruptions may be referred, with little uncertainty, in the main to the succeeding Pliocene; an epoch remarkable for outbreaks of vulcanicity over large portions of the globe. At

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[1] "Voyage d'Exploration à la Mer Morte," par M. le Duc de Luynes; tome 3me, "Géologie" (Paris).

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